

INEL Historical Dose Evaluation  
Quality Assurance File

- ☒ Source Term Quality Control Tasks (Operational Releases) (#8)  
☐ Source Term Quality Control Tasks (Episodic Releases)  
☐ Dispersion Coefficient Quality Control Tasks (Operational)  
☐ Dispersion Coefficient Quality Control Tasks (Episodic)  
☐ Dose Conversion Factors Quality Control Tasks  
☐ Ingestion Uptake Factors Quality Control Tasks  
☐ Radionuclide Half-lives Quality Control Tasks  
☐ Deposition Velocities Quality Control Tasks  
☐ Exposure Scenario Parameters Quality Control Tasks  
☐ Lotus Spreadsheet and Report Quality Control Tasks

Operation

*Corrections and Additions to Operational Source Term - 1979 to 1989.*

- ☒ Documentation  
☐ Appropriateness  
☒ Transcription  
☐ Verification

Prepared by

*Richard L. Dickson*

Date

*12/17/90*

Quality Assurance Review

- ☒ 100% *to changes*  
☐ Spot: \_\_\_\_\_%

Reviewed by

*Eddie M. Chew*

Date

*1/7/91 EMC*

12/17/90

Operational Source Term Spreadsheet  
Corrections and Additions - OST1.WK1  
1979 to 1989

A spreadsheet, OST1.WK1, was created on 12/14/90 by R. L. Dickson as a controlled copy of the operational source terms for INEL facilities from 1952 through 1989. The spreadsheet was derived from the source term in the spreadsheet IDA12A.WK1. IDA12A.WK1 had been under the control of M. Case.

*RD*  
*12/14/90*  
The ~~each~~<sup>RD</sup> individual radionuclide value for each operational source term from 1979 through 1989 were reviewed and verified by R. L. Dickson on 12/14/90. The source terms from 1979 through 1987 were reviewed against the data contained in the 03/06/89 RWMIS Summary Report. The release of Kr-85 in 1987 was changed to <250,000 Ci as indicated in the attached Interoffice Memorandum from E. W. Chew. The data for 1988 and 1989 were reviewed against the data sheets provided by E. W. Chew (see attachments). A copy of the spreadsheet OST1.WK1 for the years of interest is attached, and corrections have been noted on it. A copy of the corrected spreadsheet for 1979 through 1989 is also attached.

Attachments:

1. Interoffice Memorandum, 11/8/90, Chew to Dickson, "Operational Release Source Terms"
2. Interoffice Memorandum, 11/30/90, Chew to Case, "1988 and 1989 Source Terms for Operational Releases"
3. Table B-10 from "The INEL Site Environmental Report for Calendar Year 1988"
4. Table B-10 from "The INEL Site Environmental Report for Calendar Year 1989"
5. OST1.WK1 for the years 1979 through 1989.
6. OST2.WK1 for the years 1979 through 1989.

U.S. Department of Energy  
Idaho Operations Office

I N T E R O F F I C E   M E M O R A N D U M

Date: 30-Nov-1990 01:49pm MST  
From: EDDIE CHEW  
ECHEW  
Dept: RESL  
Tel No: 6-2335

TO: MARILYN CASE

( PAPER MAIL )

CC: RICHARD DICKSON

( RDICKSON )

Subject: 1988 and 1989 Source Terms for Operational Releases

Per our discussion this morning, I have checked the 1988 and 1989 source terms against the RWMIS data in the annual RWMIS reports. The information given to you is correct with one exception--the C-14 in 1989 was changed from 0.19 curies in the draft to 0.21 curies in the final report. Please make that change in the source term. I have checked each of these years against the screening criteria on page A-5 of the draft Dose Evaluation report. They are correct.

You will also need the following information from the annual Environmental Reports.

	MESODIF Dispersion Coefficient	Location	Distance to Receptor	Annual Average Wind Speed Toward Receptor
1988	90 E-09 hr <sup>2</sup> /m <sup>3</sup>	Terreton	54 km	28.1 km/h
1989	80 E-09	Atomic City	19.1 km	8.7 km/h

U.S. Department of Energy  
Idaho Operations Office

I N T E R O F F I C E   M E M O R A N D U M

Date: 08-Nov-1990 04:00pm MST  
From: EDDIE CHEW  
ECHEW  
Dept: RESL  
Tel No: 6-2335

TO: RICHARD DICKSON

( RDICKSON )

Subject: Operational Release Source Terms

In the process of generating the letter to Diane Larsen at Headquarters, I looked at the total curies of releases you sent me. As we discussed, the total you gave me for 1974 did not agree with the RWMIS rounded total. However, that was due to a rounding of the Kr-85 result of 253,860 Ci to 250,000 curies. No action is necessary. The totals for 1956 to 1966 will be revised. The remaining totals agree with the RWMIS totals, except for 1987. The preliminary number for Kr-85 was less than 160,000 Ci. The final number was less than 250,000 Ci. This should be corrected in the Dose Evaluation source term.

TABLE B-10  
RADIONUCLIDE COMPOSITION OF AIRBORNE EFFLUENTS (1988)

			Airborne Effluent (Ci) <sup>a</sup>				
	Radionuclide	Half-Life	ANL-W	ICPP	NRF	TRA	Total <sup>b</sup>
Noble Gases	✓ Kr-85	10.7 yr	—	<120,000	6.9 x 10 <sup>-3</sup>	—	<120,000 ← 170,000 ✓
	✓ Ar-41	1.83 h	0.74 ✓	—	—	2,100 ✓	2,100 ✓
	✓ Xe-133	5.25 d	440	—	—	9.5 ✓	450 ✓
	✓ Xe-138	14.2 min	5.6	—	—	200 ✓	200 ✓
	✓ Xe-135	9.10 h	110	—	—	75 ✓	190 ✓
	✓ Kr-87	1.27 h	12	—	—	65 ✓	77 ✓
	✓ Kr-88 + D	2.84 h	18	—	—	56 ✓	74 ✓
	✓ Xe-135m	15.3 min	2.1	—	—	41 ✓	43 ✓
	✓ Kr-85m	4.48 h	17	—	—	21 ✓	38 ✓
Particulates	✓ Sb-125	2.73 yr	—	7.4 ✓	—	—	7.4 ✓
	✓ Cs-138	32.2 min	—	—	—	0.83 ✓	0.83
	✓ Rb-89	15.4 min	—	—	—	0.82 ✓	0.82
	✓ Rb-88	17.7 min	—	—	—	0.51 ✓	0.51
	✓ Ba-139	1.39 h	—	—	—	8.4 x 10 <sup>-2</sup> ✓	8.4 x 10 <sup>-2</sup>
	✓ Br-82	1.49 d	2.2 x 10 <sup>-2</sup> ✓	—	—	—	2.2 x 10 <sup>-2</sup>
	✓ Ru-106	372 d	—	1.9 x 10 <sup>-1</sup> ✓	—	—	1.9 x 10 <sup>-1</sup>
	✓ Cr-51	27.8 d	—	—	—	1.0 x 10 <sup>-2</sup> ✓	1.0 x 10 <sup>-2</sup>
	✓ Na-24	15.0 h	—	—	—	8.9 x 10 <sup>-3</sup> ✓	8.9 x 10 <sup>-3</sup>
	✓ Tc-99m	6.01 h	—	—	—	3.7 x 10 <sup>-3</sup> ✓	3.7 x 10 <sup>-3</sup>
	✓ Y-91m	49.7 min	—	—	—	1.8 x 10 <sup>-3</sup> ✓	1.8 x 10 <sup>-3</sup>
	✓ Cs-137 + D	30.2 yr	1.0 x 10 <sup>-6</sup> ✓	6.4 x 10 <sup>-4</sup> ✓	—	1.6 x 10 <sup>-3</sup> ✓	6.8 x 10 <sup>-4</sup>
	✓ Sr-90 + D	28.6 yr	—	1.1 x 10 <sup>-4</sup> ✓	—	2.1 x 10 <sup>-4</sup> ✓	3.3 x 10 <sup>-4</sup>
	✓ Pu (total) 238	—	—	1.6 x 10 <sup>-3</sup> ✓	—	—	1.4 x 10 <sup>-3</sup>
	✓ Pu 239/240	—	—	—	—	—	2.1 x 10 <sup>-6</sup>
H-3, C-14 and Iodine Isotopes	✓ H-3	12.3 yr	3.5	760-198 ✓	0.24-0.1 ✓	—	770-100 ✓
	✓ C-14	5.7 x 10 <sup>3</sup> yr	—	2.6 ✓	0.16 ✓	—	2.7 ✓
	✓ I-129	1.6 x 10 <sup>7</sup> yr	—	0.22 ✓	—	—	0.24 0.22
	✓ I-132	83.0 min	—	—	—	2.0 x 10 <sup>-3</sup> ✓	2.0 x 10 <sup>-3</sup>
	✓ I-133	20.8 h	—	—	—	5.8 x 10 <sup>-4</sup> ✓	5.8 x 10 <sup>-4</sup>
	✓ I-131	8.04 d	—	—	1.6 x 10 <sup>-6</sup> ✓	1.7 x 10 <sup>-4</sup> ✓	1.7 x 10 <sup>-4</sup>
All Other Total			3.7 x 10 <sup>-3</sup>	1.2 x 10 <sup>-3</sup>	2.4 x 10 <sup>-6</sup>	2.5 x 10 <sup>-3</sup>	1.6 x 10 <sup>-2</sup>
Grand Totals			620	<121,000	0.40	2,600	<124,000

- a. Radioactivity listed in 1988 Radioactive Waste Management Information System Report. Values are not corrected for decay after release. Data are preliminary.
- b. Totals include small amounts from facilities not listed.
- c. The actual number of curies is classified information.
- d. Parent-daughter equilibrium assumed.

adjust Rb 88 (out)  
Pu total 6.8  
1.4 x 10<sup>-3</sup>  
2.1 x 10<sup>-6</sup>

OK 11/29/90  
checked against criteria  
and final RWMS for 1988  
Eckman 11/13/90

**TABLE B-10**  
**RADIONUCLIDE COMPOSITION OF AIRBORNE EFFLUENTS (1989)**

			Airborne Effluent (Ci) <sup>a</sup>				
	Radionuclide	Half-Life	ANL-W	ICPP	NRF	TRA	Total <sup>b</sup>
Noble Gases	✓ Kr-85	10.7 yr	0.78	<20,000 <sup>c</sup>	$6.4 \times 10^{-4}$	—	<20,000 ✓
	✓ Ar-41	1.83 h	1.9	—	—	1400	1400 ✓
	✓ Xe-133	5.25 d	400	—	—	4.8	400 ✓
	✓ Xe-135	9.10 h	120	—	—	46	160 ✓
	✓ Xe-138	14.2 min	43	—	—	120	160 ✓
	✓ Kr-88	2.84 h	45	—	—	34	79 ✓
	✓ Kr-87	1.27	35	—	—	41	76 ✓
	✓ Xe-135m	15.3 min	20	—	—	26	46 ✓
	✓ Kr-85m	4.48 h	23	—	—	13	36 ✓
Particulates	✓ Cs-138	32.2 min	—	—	—	0.42	0.42 ✓
	✓ Rb-89	15.4 min	—	—	—	0.26	0.26 ✓
	<del>✓ Rb-88</del>	17.7 min	—	—	—	0.17	<del>0.17</del>
	✓ Ba-139	1.39 h	—	—	—	$3.0 \times 10^{-2}$	$3.0 \times 10^{-2}$ ✓
	✓ Br-82	1.49 d	$4.8 \times 10^{-3}$	—	—	—	$4.9 \times 10^{-3}$ ✓
	✓ Na-24	15.0 h	—	—	—	$2.7 \times 10^{-3}$	$2.7 \times 10^{-3}$ ✓
	✓ Cr-51	27.8 d	—	—	—	$2.3 \times 10^{-3}$	$2.3 \times 10^{-3}$ ✓
	✓ Ru-106	372 d	—	$2.0 \times 10^{-3}$	—	—	$2.0 \times 10^{-3}$ ✓
	✓ Y-91 m	49.7 min	—	—	—	$1.5 \times 10^{-3}$	$1.5 \times 10^{-3}$ ✓
	✓ Sb-125	2.73 yr	—	$3.9 \times 10^{-4}$	—	—	$3.9 \times 10^{-4}$ ✓
	✓ Cs-137	30.2 yr	—	$1.5 \times 10^{-4}$	—	$5.3 \times 10^{-5}$	$2.1 \times 10^{-4}$ ✓
	✓ Sr-90 + D <sup>d</sup>	28.6 yr	—	$4.5 \times 10^{-5}$	—	$4.3 \times 10^{-5}$	$9.1 \times 10^{-5}$ ✓
	<del>Pu (total)</del> <i>Stat Pu-238</i>	—	—	$8.1 \times 10^{-8}$	—	—	<del><math>8.1 \times 10^{-8}</math></del> <i>8.1 x 10<sup>-8</sup></i>
II-3, C-14 and Iodine	✓ II-3	12.3 yr	1.0	1.7	$3.9 \times 10^{-2}$	—	2.7 ✓
	✓ C-14	$5.7 \times 10^3$ yr	—	$3.4 \times 10^{-2}$	0.15 <i>0.172</i>	—	0.19 <i>0.20, 0.21</i>
Isotopes	✓ I-129	$1.6 \times 10^7$ yr	—	$1.4 \times 10^{-3}$	—	—	$1.4 \times 10^{-3}$ ✓
	✓ I-132	83.0 min	—	—	—	$3.8 \times 10^{-4}$	$3.8 \times 10^{-4}$ ✓
	✓ I-133	20.8 h	—	—	—	$3.5 \times 10^{-4}$	$3.5 \times 10^{-4}$ ✓
	✓ I-131	8.04 d	—	—	$3.5 \times 10^{-7}$	$1.2 \times 10^{-4}$	$1.2 \times 10^{-4}$ ✓
All Other							
Total			$3.9 \times 10^{-5}$	$4.1 \times 10^{-7}$	$1.2 \times 10^{-5}$	$2.4 \times 10^{-3}$	$2.5 \times 10^{-3}$
Grand Totals			690	<20,000	0.19	1,700	<22,000

- a. Radioactivity listed in 1989 Radioactive Waste Management Information System Report.<sup>4</sup> Values are not corrected for decay after release. Data are preliminary.
- b. Totals include small amounts from facilities not listed.
- c. The actual number of curies is classified information.
- d. Parent-daughter equilibrium assumed.

$$Pu-239/45 \quad \frac{8.1 \times 10^{-8}}{7.8} = 1.0 \times 10^{-8}$$

$$Pu-238 = 8.1 \times 10^{-8} - 1.0 \times 10^{-8} = 7.1 \times 10^{-8}$$

*RWD*  
*12/11/90*

*Adjust*

*OK 11/30/90*  
*Checked against*  
*criteria and final*  
*RWMIS for 1989* *Edie M. Ch...*

*Rb 88*  
*Total Pu*

12/17/90

Operational Source Term Spreadsheet  
Corrections and Additions - OST1.WK1  
1979 to 1989

- 1989    Changed I-129(ELE) to  $4.7\text{E}-04$ .  
         Changed I-129(ORG) to  $9.3\text{E}-04$ .  
         Changed Pu-238 to  $7.1\text{E}-08$ .  
         Changed Pu-239/240 to  $1.0\text{E}-08$ .
- 1988    Changed I-129(ELE) to  $7.3\text{E}-02$ .  
         Changed I-129(ORG) to  $1.5\text{E}-01$ .
- 1987    Change the current Kr-85 value from <160,000 Ci to <250,000 Ci.
- 1982    Changed Kr-85 to  $8.7\text{E}+03$ .  
         Changed I-129(ELE) to  $3.2\text{E}-02$ .  
         Changed I-129(ORG) to  $6.5\text{E}-02$ .
- 1980    Changed Cs-137 to  $1.9\text{E}-02$ .

Format Revisions: The formats for 1988 and 1989 were changed to show only two significant digits. The source terms for 1988 and 1989 were interchanged in OST1.WK1 and were corrected.